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ABSTRACT

The paper reviews normal communication skills in infants, young children, and adults from the perspective of barriers to communication interaction and implications for handicapped individuals. The communicative competence construct is described, noting the complex relationship between verbal and nonverbal behavior. Parental response to a child's communicative intent, as well as related aspects of parent-child interaction, such as game playing and turn-taking, are particularly critical to the development of the child's system of communication. Barriers to successful interaction between communicatively impaired individuals and others include (1) problems related to the handicapping condition (e.g., learned helplessness, uncontrolled physical movement, fixed communication zones, difficulties with voice quality, pitch, and intensity); and (2) problems related to the augmentative device (e.g., positioning, rate of transmission, training of communicative partners). Assessment should include evaluation of common deficiencies as well as communicatively adaptive and functional behaviors. A variety of intervention strategies are described, including contingency intervention, buddy training, and attitudinal training. The process of successful communicative exchange depends on technical as well as functional competence in the use of augmentative communication devices, and on direct participation by both the augmentative communication devices, and on direct participation by both the communicative system user and important others in the environment. (JW)

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Communication Interaction and Implications for Handicapped Individuals

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Running head: COMMUNICATION INTERACTION

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Abstract

It has become apparent that provision of a communication prosthesis to a nonspeaking individual is not sufficient to assure effective communication. This paper is an attempt to review "normal" communication skills in infants, young children, and adults. These skills are then discussed in terms of "barriers" to normal communication interaction and implications for handicapped individuals. General strategies for prevention of communication interaction breakdowns are also presented for various age levels, taking into account the multi-dimensional needs of communicative impaired individuals and their interactants.

Communication Interaction and Implications

for Handicapped Individuals

The majority of research in augmentative communication consists of descriptions of various communication devices (McDonald & Schultz, 1973; Vanderheiden & Grilley, 1976), prerequisite skills needed (Chapman & Miller, 1979; Sailor, Goetz, Schuler, Utley, & Baldwin, 1980), and hardware evaluation and symbol selection (Harris & Vanderheiden, 1980). Little research has looked beyond the evaluation process and studied how augmentative systems are actually being used in daily life. Very little information, therefore, is available regarding the role of communication systems in facilitating interactions.

Many nonvocal children experience severe physical handicaps, and as a result have difficulty in interacting with, manipulating, or learning from their physical and social environments (Harris, 1982). Communication prostheses have provided nonvocal children with a mode of expression, a channel through which to communicate (Harris, 1982). These handicapped individuals, however, also need to be able to use their communication prostheses in the process of interacting with others in their environment (Higginbotham & Yoder, 1982). This will allow that individual to fully participate in and interact with the environment, thereby having a direct impact on what is happening around them.

A concept which was developed by the field of Psychology in the past ten

years is that of "learned helplessness." Seligman (1975) states that learned helplessness results when a person expects that the important events or outcomes in his life are independent of his own responding. This learned helplessness results in weakening the motivation to respond, retarding the ability to learn that responding works and emotional disturbance. These individuals become passive recipients as they stop trying to control events in their lives. This learned helplessness interferes with the person's ability to learn that he/she can control their outcomes.

The way to remedy or prevent helplessness according to Smith (1978) is to show the individual that he can control his environment. The ability to act upon and interact with the environment opens up an entirely new world for the handicapped with important results in all phases of his life, including language, cognition, and personality.

Communicative Competence Construct

There has been much written regarding interaction skills needed to maintain a conversation and also many reserach attempts to analyze the components of interaction between infants and their caregivers (Chapman & Miller, 1979; Dunst & Lowe, 1986; Harris, 1982; Higginbotham & Yoder, 1982). Interaction has been proposed as the focal point around which communication programs should be initiated, maintained, and terminated (Harris &

Vanderheiden, 1980; Silverman, 1980).

The quality of early interactions is believed to influence later patterns of development in all areas: intellectual, emotional, physical or motor, linguistic, and social. The goal of an augmentative communication program then should be to facilitate effective interaction between nonspeaking individuals and their multi-dimensional environment (Bottorf & Depape, 1982).

Interaction refers to a reciprocal relationship between two or more persons in which the behavior of one person is conditional upon a response from the other and, in turn, the other person's behavior is influenced by the partner's response (Yarrow, 1978). Handicapped children need to be able to do more than formulate and express basic thoughts and desires (Harris, 1982) with a communication prosthesis. They should be able to participate in and have an impact upon their environment.

Therefore, it is important to discuss the skills needed in participating in "normal" communicative interaction processes and then discuss these processes in terms of potential barriers to the development of effective interaction of the handicapped population.

According to Higginbotham and Yoder (1982) conversational ability and competence is dependent on the knowledge of social conventions, the communication of culturally relevant nonverbal signals, and the ways in which

these signals are exchanged. Birdwhistell (1970) indicates that 35% of information exchange is oral language, while 65% is nonverbal language.

Natural face-to-face interactions comprise both verbal and nonverbal communicative behaviors (Higginbotham & Yoder, 1982). Nonverbal signals such as gestures and facial expression often provide much information and according to Argyle (1972) assist in the ongoing social relationship. Infants up to seven months of age have a well-developed sense of nonverbal communication and have learned to communicate their needs primarily through pointing, grunting, and differential crying (Anastasiow, 1983; Sugarmen-Bell, 1978).

According to Argyle (1972) there are four communicative functions of nonverbal behavior including the following: it conveys interpersonal attitudes towards the participants; it expresses emotional states; it presents information regarding the speaker's status, and; it encompasses speech for the purpose of managing turn taking, attention, and conversational feedback. The nonverbal system is composed of the kinesic system and proxemic system (Hopper & Naremore, 1978) and paralinguistic system (Knapp, 1978).

The kinesic system, according to Knapp (1978) emcompasses all of the postures and bodily movement occurring during the communicative act. Facial expression and body movements express interpersonal affect or one's emotional state, which assist in maintaining the attention of the listener and regulates the

conversational interaction taking place betwen the members of the dyad (Higginbotham & Yoder, 1982).

Interpersonal distance, or proxemics, is another nonverbal communication system that is used to communicate the level of interpersonal intimacy between two interactants. Shifts in proximity may also be employed to initiate or terminate a conversation or to take a speaking turn (Higginbotham & Yoder, 1982; Hopper & Naremore, 1978).

According to Knapp (1978) paralanguage is another aspect of nonverbal communication and includes the vocal aspects of communication such as articulation control, pitch height and range, stress, and intonation. Linguistic information and nonlinguistic information such as the speaker's culture, personality characteristics, and emotional state is transmitted via the paralinguistic channel.

The chronemic (temporal) dimension is also discussed by some authors (Higginbotham & Yoder, 1982; Knapp, 1978; Poyotos, 1980) as assisting in carrying the communicative load including such time-based phonomena as rhythm, rate, silence, and stillness.

The following information in Tables 1, 2 and 3 has been adapted from Higginbotham and Yoder (1982) and lists the kinesic, proxemic, and paralinguistic communication systems and their appropriate forms and functions

utilized during the course of conversational interaction:

Insert Tables

1, 2, & 3

about here

It can be seen then that the nonverbal system provides much communicative information to both the listener and the speaker participating in the interaction. Verbal communication on the other hand is especially effective for conveying information regarding reference to and description of objects and events displaced by time and space and the relationships existing between entities (Higginbotham & Yoder, 1982). It is often very difficult to separate the contributions of the verbal and nonverbal communication components (Argyle, 1972; Knapp, 1978; Poyotos, 1980) as both systems function as a unified communicative construct by enhancing and assisting in carrying the communication load.

Communicative functioning then implies a complex relationship between verbal and nonverbal behavior. The degree to which individuals are able to successfully arrange and utilize the communication systems (language, paralanguage, nonverbal, and chronemics) to express their desires and

intentions within a conversational interaction is referred to by Poyotos (1980) as their level of conversational fluency. According to Higginbotham and Yoder (1982) conversationally fluent persons adapt their communication repertoire to meet their communicative goals and the needs of the listener, in accordance with constraints which are often imposed by the environment.

Child Development and Interaction

The literature on child development and interaction as a basis for intellectual, emotional, physical, linguistic and social development, is reported from several disciplines. There has also been an abundance of information regarding interaction skills needed to maintain a conversation (Anastasiow, 1983; Clark & Seifer, 1983). The infants' capacity to participate and the parents' ability to interpret and adapt to the infant's communication are critical to the acquisition of developmental skills (Siders & Bradley, 1984a).

An important factor then in the development of a system of communication is the ability of parents to read their infants' signals (Clark & Seifer, 1983). The careful caretaker responds appropriately to the child's communicative intent, allowing the child to achieve successful communication through nonverbal and paralinguistic systems. Mothers of normal children provide frequent opportunities for child-initiated speech and consistently offer responsive interpretations of the child's verbal and nonverbal acts (Jones, 1980). This helps

to establish some expectancy on both members of the dyad. Mothers of normal children also adapt their speech to the child's language level. They simplify their speech to language learning children and gradually increase the complexity of their speech as the child's linguistic skills increase (Snow, 1972)

Game Playing and Turn-Taking

Game playing and turn-taking are important aspects of the communication process. Early language is learned in a dialogue with a primary caretaker during play routines or activities with familiar objects (Meyers, 1984). Theorists such as Mead (1934) and Bruner (1975) have also suggested that the rudiments of social behavior are acquired in early games between mothers and their infants, as children learn the structure and reciprocal nature of social interaction (McHale & Olley, 1982). Learning also leads to more sophisticated play and play provides a kind of mastery that leads to more sophisticated learning, which helps the child reach an adult level physically, intellectually, emotionally, and socially (Chance, 1979). According to Chance (1979) play is also one of the chief ways by which children become enculturated. It helps to integrate new members and gives it's members the ability to adapt to change. This is important as the constraints that govern communication and conversation behavior are also in part, culturally based.

As growth and development progress, the potential for physical and

cognitive development may be encouraged or reduced by interactions between the developing child and the many environmental factors to which he/she may be exposed (Hardy & Welcher, 1980). Mother-child interaction appears to be a critical factor. Many mothers may be impatient with their babies, they may not give the babies adequate time for a verbal response, nor do they reinforce language performance. In addition, mothers may not encourage language development, and their own language may be a poor model for the infant's learning (Hardy & Welcher, 1980).

Barriers to Successful Interaction

It can be noted that certain variables may have a high probability of impeding the conversational process between communicatively impaired individuals and their interactants. They may cause the conversational process to not be initiated or may cause a breakdown in the process (Higginbotham & Yoder, 1982). These variables include problems relating to the handicapping condition itself and also problems directly related to the augmentative device or technique(s) employed for communication interaction.

Problems Related to the Handicapping Condition

Parent/Child Interaction. Because most early handicapping conditions have a considerable motor component, the infant may not be able to engage the environment. One also often notes a systematic attempt to lower parent's

expectations regarding their infant's development, which may significantly change their interaction with their infant (Brinker & Lewis, 1982). According to Siders and Bradley (1984b) interactive child behaviors which are associated with delayed development include: less responsiveness and assertiveness; transmission of unclear signals; low arousal level, and; little feedback. Parent behaviors reported by Siders and Bradley (1984b) to impede child development include: active directing of the child's behavior; failure to accept "less of a response" as a child's turn; failure to be affectively available (maintains a still face), and; lack of responsiveness to the child's attempts to interact.

Learned Helplessness. Many handicapped individuals have not had the opportunity to interact with, manipulate or learn from their social and physical environment. These individuals become passive recipients rather than active participants int he communication process.

Kinetic System. The handicapped person may experience difficulty in limb and head movement or difficulty in control of movement. The person who cannot move at all is limited in his ability to effect nonverbal communication. The person who has uncontrolled movement will find the listener distracted by such kinetic behavior. Facial movements may be misinterpreted by the communicative partner thereby limiting valuable cues as to communicative intent.

Proxemic System. The handicapped person may be bound to a single

place and therefore may be unable to shift interpersonal communication zones. This individual may also be unable to adjust the body, regulate head movements or eyegaze as it relates to distance. Further, the normal distances observed in interpersonal communication may not be appropriate because of the use of the prosthesis, which the speaker may have to operate and which the "listener" has to observe (e.g. CRT monitor).

Paralinguistics and Chronemics. Voice quality, pitch, and intensity may not be used to signal important messages, sexual attributes, emotional arousal or linguistic competence. Since the rate of communication is slow, pause and juncture may not be differentiated when the handicapped individual speaks. Question language which causes rising intonation may also be limited or absent in the handicapped speaker.

Turn-Taking. Game playing (verbal and nonverbal) may be lacking in handicapped children, and therefore turn-taking is effected. According to Harris (1982) the absence of early turn-taking activities may result in altered conversational patterns, laborious formulation and expression of messages, neglect of the speaker's repertoire of expressive modes, negative effects of symbol or sign system on concept formation, and poor motivation and interest levels. Adults (individuals who once spoke but must now rely on prostheses) may also have difficulty with turn-taking. This is related to their superior language

skills and increased independence as adults. This is supported by Buzolich (1983) who reports that augmented communicators are successful only 50% of the time in obtaining speaking turns while normal speakers are successful 100% of the time.

Problems Relating to the Augmentative Device

Placement of the Device. The placement of the device itself may violate the intimate zone of communication or the normal face-to-face interaction.

Rate of Transmission. The length of time needed to successfully formulate, transmit, relay, and acknowledge a thought is much longer in interactions involving nonvocal persons (Harris, 1982). This may affect the actual interaction and the type, quality, and duration of interactions. Normal conversation takes place at the rate of approximately 150 to 180 words per minuted (wpm) according to Fairbanks (1960). The maximum rate for most speech prostheses is 35 words per minute. This slow rate of communication may: cause frustration on the part of the speaker; cause the listener to become bored or annoyed, and; limit what is said in a given time period. The nonvocal person then must concentrate as much or more time and energy on the physical task of expressing the message, as well as what he or she will communicate, and how it will be received (Harris, 1982).

Physical Structure of the Tool. The physical structure of an augmentative

communication system tool is critical to its successful use for interaction and must be developed uniquely for each individual (Bottorf & DePape, 1982). Emphasis should be placed on the messages themselves rather than how they are sent, as the primary goal of intervention is to facilitate interaction. According to Bottorf and DePape (1982) this has implications for symbol systems and vocabulary selection. The symbol system may not use traditional orthography causing confusion on the listener's part. The device itself may not have all of the necessary messages or allow the use of creative language. The symbol system then should be able to be adapted to include new items, be easy to learn, and allow expression of more than concrete messages. The vocabulary items should reflect the individual's lifestyle and interests and accommodate daily variations.

Training of the Communicative Partners. The communicatively impaired individual using a speech prosthesis will also need to adapt his or her conversational skills to meet demands imposed by the current situation. In addition, according to Higginbotham and Yoder (1982) the success of any interaction also depends upon the other interactants range of acceptance for deviant message forms and content, as well as his ability to adapt and coordinate communications to fit the cognitive and perceptual requirements of the handicapped individual. Communicative partners may lack training in interpersonal communication skills when one interactant is using a speech

prosthesis. Familiarity with one's interactants then plays an important role in determining the types of interactive strategies employed and the probability of success in sustaining a conversation (Higginbotham & Yoder, 1982). The inability of an individual to speak often excludes him from anything more than superficial interpersonal interaction, except with persons who are willing to expend time and energy in the effort (Beukelman & Yorkston, 1984). The average communication partner or an individual who is a stranger may not attempt to communicate with the nonspeaking individual. If an individual is unfamiliar with the impaired person's communication style, interaction will be unsuccessful. The inability of the impaired individual to employ socially conventional signals for turn regulation or the exhibition of in congruent verbal and nonverbal messages, or excessively slow speech rates may significantly disrupt the conversational process (Higginbotham & Yoder, 1982).

Assessment and Intervention

Nonspeaking persons vary considerably across age, etiology, physical and cognitive abilities, life style, daily activities, and support persons (Bottorf & DePape, 1982). Therefore, the role that an augmentative communication system plays in interaction may vary considerably. It is therefore important to individualize intervention strategies and to obtain an indepth analysis of all of the communication situations and people encountered by a specific system user

(Bottorf & DePape, 1982). Assessment of a person's communication skills should include performance in various conversational settings. It should include evaluation of both communication deficiencies and communicatively adaptive and functional behaviors employed during conversations (Higginbotham & Yoder, 1982). The assessment should be an ongoing process and should continue through all phases of intervention. The need for language sampling procedures and analyses formats appropriate to interaction with augmentative communication users has been identified (Kraat, 1981). Fishman, Timler, and Yoder (1985) utilized a coding system to analyze strategies used by non-automated communication board users and their speaking interactants to prevent and repair breakdowns in communication. They developed the procedure in response to the need for pragmatic and conversational analyses of interactions with augmentative system users. Video tape recording may be one of the most powerful methods of data collection and can be utilized in analyzing communication disruptions to provide appropriate intervention strategies (Higginbotham & Yoder, 1982).

Intervention

Intervention strategies need to be individualized and nonvocal children must be taught to initiate and maintain communicative exchanges with other individuals. It is also important to note that responsibility for and participation in

communicative exchanges should be mutually shared by the message sender and the receiver. When the results are not shared the communicative exchange becomes dominated by one of the participants and results in limited, passive participation by the other (Harris, 1982). Communication partners must therefore be trained in techniques for resolving breakdowns when they occur (Beukelman & Yorkston, 1982). Orientation and training for all communication partners are vital for a smooth transition from one environment to another (Shane, Lipschultz, & Shane, 1982). Primary communication partners not only need to be trained in interaction strategies but also be thoroughly familiarized with the operation and maintenance of the augmentation system.

Contingency Intervention. Contingency intervention (Brinker & Lewis, 1982) is one intervention strategy which attempts to arrange events that can be consistently controlled by an infant's behavior. This curriculum is an attempt to provide motivation to the infant to control environmental events which, is a prerequisite to communication interaction. According to Brinker and Lewis (1982) the contingency intervention curriculum is designed to provide handicapped infants with learning situations that foster an awareness of their own abilities to control their environment. They suggest utilizing the microcomputer as a learning prosthesis for handicapped infants. Meyers (1984) also discusses the use of the microcomputer as an augmentative communication

device and language development tool for toddlers with delayed speech. The flexibility, speed, and increasing portability of microcomputer technology may assist in solving the interpersonal communication problems of the nonspeaking individual (Beukelman & Yorkston, 1984).

Buddy Training. Miller and Higgins (1984) discuss "buddy training" which involves training a "buddy" to understand how the communication system works, so that if a communication breakdown occurs he is able to intervene and facilitate the interaction and message completion. The process includes the following steps according to Mills and Higgins (1984): Client and trainer model the interacting process in a training setting and the buddy observes; client and buddy interact in the training session using the communication system; client and buddy role play in the simulated environment; client, buddy, and trainer discuss the system and environmental limits; client and buddy enter and experience the real life environment, and; the trainer is available for follow-up training and consultation. Training then needs to occur across people and environments to assist in creating a more adaptable and flexible repertoire for communication between the child and his environment.

Attidudinal Training. Attitudinal training may also be necessary as the speaker's (or listener's) general experience and motivation to communicate and interact with others is very important (Harris, 1982). Some of the attitudes which

need to be discussed as indicated by Mills and Higgins (1984) include the following: What needs the present communication skills meet; the client's need for feelings of control; the new communication skills as a facilitator; expectations for speech; the client's need to create or generate communication; the client's need for independence; the client's need for universality in communication; the inadequacies of the present communication system, and; the importance of support attitudes to ensure long-term success of the system.

Message Preparation. Message storage and retrieval systems, predictive language systems, and systems customized to take into account frequency of occurrence of words and phrases in the display arrangements are now being utilized to enhance overall communication rate.

Conclusion

The process of developing effective social interaction skills is complex and while an augmentative communication device can help to make the process easier, the system itself cannot do the interacting for the child. Although communication devices have been credited with increasing their user's frequency of initiations (Harris-Vanderheiden, Brown, MacKenzie, Reinen, &Scheibel, 1975) as well as the range of meanings they express and the number of persons to whom they express meanings (Harris, Lippert, Yoder, & Vanderheiden, 1979), much more information is needed in terms of improving

the mutual participation of both interactants to complete a satisfying and successful communicative exchange. According to Buzolich and Higginbotham (1985) the earliest phase of training should emphasize operational or technical competence training in using the system. Once this is accomplished functional competence should be established in naturalistic contexts. Both phases should emphasize the direct participation by both the augmentative communication system user and important others in the environment.

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Table 1

Kinesic Communication Systems

Categories	Functions
Emblems	
--Head shake for "yes/no", pointing index finger for "you" or "that"	--Convey meaning, modify associated linguistic message
Illustrations and Other Body Motions	
--Gestures depicting logical or spatial relationships	--Modify or clarify linguistic message
--Other fine and gross motor body movements that are in temporal synchrony with speech	--Indicate level of interpersonal involvement and attention to the interlocuter; mark

(table continues)

Table 1

Kinesic Communication Systems

Categories	Functions
rhythms of self or interactant	phonemic, syntactic, and semantic boundaries
Regulators	
--Head movements, gaze direction and shifts, arm and hand movements and tension, facial displays, and postural shifts	--Initiate and terminate conversations, regulate turn taking, provide listener and speaker feedback, maintain attention

(table continues)

Table 1

Kinesic Communication Systems

Categories	Functions
Adaptors	
--Body or object-focused psychological movements	--Indicate anxiety or discomfort or emotional arousal

Table 2

Proxemic Communication System

Categories	Functions
Distance between	
Public	
--12 ft. - visible limit	Indicates personal
Social-Consultive	relationship and level of
--4 ft. - l2 ft.	interpersonal attraction;
Personal	proxemic shifts also
--18 in. - 4 ft.	regulate interactions
Intimate	
--Contact - 18 in.	

Table 3

Paralinguistic Communication System

Categories	Functions
Vocal Quality	
--Pitch range; articulation control; rhythm control; resonance; tempo	--Sex differentiation, emotional arousal, personality characteristics linguistic comprehension
Vocal Characterizers	
--Laugh, cry, yawn, sneeze, cough	--Emotional and psychological state
--Marked inhalation, vocal clicks, etc.	--Interaction regulation
Vocal Qualifiers	
--Intensity; pitch height	--Personality characteristics, emotional arousal,

(Table Continues)

Table 3

Paralinguistic Communication System

Categories	Functions
	interaction regulation
--Extent (drawl, clip)	--Social status, ethnic affiliation
Vocal Segregates	
--Filled pauses; hesitations, silences, pauses	--Express emotion, convey meaning, modify linguistic message, regulate interaction
Prosodic	
--Segmental stress	--Clarify linguistic structure, express emotion

(table continues)

Table 3

Paralinguistic Communication System

Categories	Functions
--Linguistic intonation	--mark sentence type, clarify meaning, regulate interaction